

Wavelength Drift Corrector for Wind Lidar Receivers, Phase I

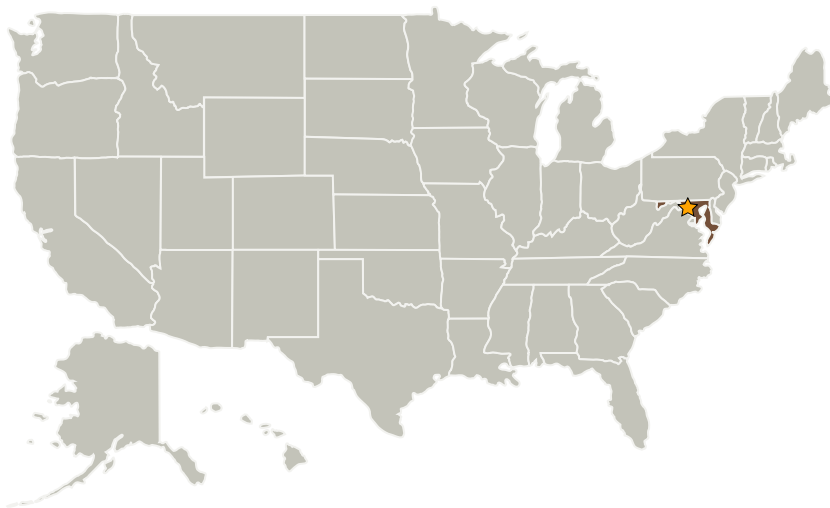
Completed Technology Project (2008 - 2009)



Project Introduction

We propose a key innovation to improve wavelength-sensitive lidar measurements (such as wind velocity) using photon-counting receivers. A novel binning technique to track the wavelength shifts of the outgoing laser pulses on a per-shot basis before accumulation in the receiver electronics is described. This allows creation of a narrow histogram in the backscattered signal accumulation process while using less expensive, less stable lasers than are traditionally required. This technique relaxes the stringent stability requirements on the laser, and therefore its size, weight, complexity, and cost. We propose to demonstrate the technique in existing lidars more compact and suitable for airborne platforms in terms of size, weight and power requirements of the system. We utilize recent solid-state laser and high-speed signal processing technologies in the wavelength tracking system. The direct application of the wavelength corrector is in a direct detection Doppler wind lidar. This innovation will significantly reduce the cost of wind lidar systems permitting their installation at airports to look for dangerous wind shears as well as for weather forecasting. Also, this innovation will significantly reduce the cost of a space-based Doppler wind lidar system because of the relaxed laser stability requirements.

Primary U.S. Work Locations and Key Partners



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Organizational
Responsibility**Responsible Mission
Directorate:**

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center
(GSFC)

Responsible Program:

Small Business Innovation
Research/Small Business Tech
Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Sigma Space Corporation	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Lanham, Maryland

Primary U.S. Work Locations

Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Donald M Cornwell

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.5 Lasers